

WHAT IS CLAIMED IS:

1. A method of modifying or manipulating body tissue by forming at least one microconduit therein, comprising the steps of:

a) accelerating a plurality of microparticles to a velocity that causes the microparticles to penetrate a region of a tissue surface upon impingement of the microparticles on the tissue surface;

b) directing the microparticles towards the region of tissue surface, thereby causing the microparticles to penetrate the tissue; and

c) scissioning the tissue with the impinging microparticles, thereby forming a plurality of free microtissue particles, and thereby forming a microconduit;

wherein said microconduit is used for manipulation or modification of the body tissue in a manner selected from the group consisting of:

- (i) extracting an analyte from the body tissue by removing the analyte from the tissue through the microconduit;
- (ii) forming a molecular matrix within at least one microconduit in body tissue by directing a molecular matrix into the microconduit;
- (iii) making at least one biopotential measurement across the body tissue by placing at least two electrodes in electrical connection with the body tissue with at least one electrode at the microconduit; and making a biopotential measurement across the electrodes;
- (iv) delivering at least one stored molecule to the body tissue by storing the molecule in at least one puncturable capsule in proximity to at least one microconduit;
- (v) reducing pressure caused by a pool of blood beneath an injured or traumatized portion of body tissue by releasing the pressure through the microconduit;
- (vi) piercing the body tissue for a decorative purpose by inserting at least one wire through one or more microconduits;

- (vii) marking the body tissue with at least one identifying mark or at least one decorative mark by directing a dye or an ink into at least one microconduit;
- (viii) treating an infection below the surface of the body tissue by administering at least one therapeutic molecule or ion by directing the therapeutic molecule or ion into at least one microconduit, thereby delivering the therapeutic molecule or ion through the surface of the body tissue;
- (ix) removing hair from the surface of the body tissue by forming one or more microconduits at or near the hair follicles on the body tissue, followed by washing with water, thereby removing the hair from the body tissue; and
- (x) implanting hair into the surface of the body tissue by forming one or more microconduits having a diameter and depth sufficient to serve as a new hair follicle on the body tissue, followed by implantation of a live hair follicle into the microconduits.

2. The method of Claim 1, wherein the body tissue is skin or nail tissue.

3. The method of Claim 1, wherein the manipulation or modification of the body tissue comprises extracting an analyte from a tissue, wherein analyte is removed from the tissue through the microconduit.

4. The method of claim 3, wherein the analyte is removed by sampling or by reducing pressure over the microconduit.

5. The method of claim 3, further comprising the step of measuring the amount of analyte while the analyte is within the microconduit.

6. The method of claim 3, wherein the tissue is skin.

7. The method of claim 5, wherein the tissue is skin.

8. The method of Claim 1, wherein the manipulation or modification of the body tissue comprises forming a molecular matrix within at least one microconduit, wherein the molecular matrix is formed within the microconduit by directing a molecular matrix into the microconduit.

9. The method of claim 8, wherein the molecular matrix is a gel.

10. The method of claim 9, wherein the gel is calcium alginate.

11. The method of claim 9, wherein the molecular matrix is a polymer matrix.

12. The method of Claim 1, wherein the manipulation or modification of the body tissue comprises making at least one biopotential measurement across the skin, by placing at least two electrodes in electrical connection with the skin with at least one electrode at the microconduit; and making a biopotential measurement across the skin.

13. The method of claim 12, wherein the biopotential measurement is an electrocardiogram.

14. The method of claim 13, wherein the electrocardiogram measurement is obtained during exercise stress testing.

15. The method of claim 12, wherein the biopotential measurement is an electromyogram.

16. The method of claim 12, wherein the biopotential measurement made is suitable for neuromuscular testing.

17. The method of claim 12, wherein the biopotential measurement is an

electroencephalogram to monitor anaesthesia.

18. The method of Claim 1, wherein the manipulation or modification of the body tissue comprises delivering at least one molecule to tissue within microconduit, comprising the step of storing the molecule in at least one puncturable capsule in proximity to at least one microconduit, and puncturing said capsule to release one or more molecules into said microconduit.

19. The method of claim 18, wherein the stored molecule includes a therapeutic molecule or ion.

20. The method of claim 19, wherein the body tissue is nail tissue.

21. The method of Claim 1, wherein the manipulation or modification of the body tissue comprises forming at least one microconduit through nail tissue, comprising the steps of:

a) accelerating a plurality of microparticles to a velocity that causes the microparticles to penetrate a region of nail tissue surface upon impingement of the microparticles on the nail tissue surface;

b) directing the microparticles towards the region of nail tissue surface, thereby causing the microparticles to penetrate the nail tissue surface; and

c) scissioning the nail tissue with the impinging microparticles, thereby forming a plurality of free nail microtissue particles, and thereby forming a microconduit through the nail tissue.

22. The method of Claim 1, wherein the manipulation or modification of the body tissue comprises a method for treating an infection of tissue underlying nail tissue, comprising the steps of:

a) accelerating a plurality of microparticles to a velocity that causes the microparticles to penetrate a region of nail tissue surface upon impingement of the microparticle on the nail tissue surface;

b) directing the microparticles towards the region of nail tissue surface, thereby causing the microparticles to penetrate the nail tissue surface;

c) scissioning the nail tissue with the impinging microparticles, thereby forming a plurality of free nail microtissue particles, and thereby forming a microconduit through the nail tissue; and

d) administering at least one therapeutic molecule or ion by directing the therapeutic molecule or ion into at least one microconduit, thereby delivering the therapeutic molecule or ion through the nail tissue.

23. The method of Claim 1, wherein the manipulation or modification of the body tissue comprises a method for marking nail tissue with at least one identifying mark or at least one decorative mark, comprising the steps of:

a) accelerating a plurality of microparticles to a velocity that causes the microparticles to partially penetrate into a region of nail tissue surface upon impingement of the microparticles on the nail tissue surface;

b) directing the microparticles towards the region of nail tissue surface, thereby causing the microparticles to partially penetrate the nail tissue surface and form a microconduit in the nail tissue; and

c) scissioning the nail tissue with the impinging microparticles, thereby forming a plurality of free nail microtissue particles, and thereby forming a microconduit through the nail tissue; and

d) directing a dye or an ink into at least one microconduit, thereby marking the nail tissue.

24. The method of Claim 1, wherein the manipulation or modification of the body tissue comprises a method for inserting at least one wire through at least one microconduit, comprising the steps of:

a) accelerating a plurality of microparticles to a velocity that causes the microparticles to penetrate a region of nail tissue surface upon impingement of the microparticles on the nail tissue surface;

b) directing the microparticles towards the region of nail tissue surface that extends beyond the body, thereby causing the microparticles to penetrate the nail tissue surface;

c) scissioning the nail tissue with the impinging microparticles, thereby forming a plurality of free nail microtissue particles, and thereby forming a microconduit through the nail tissue; and

d) directing a wire into at least one microconduit, thereby inserting the wire through the microconduit.

25. The method of Claim 1, wherein the manipulation or modification of the body tissue comprises a method of reducing a pressure caused by a pool of blood beneath an injured or traumatized nail comprising the steps of:

a) accelerating a plurality of microparticles to a velocity that causes the microparticles to penetrate a region of nail tissue surface upon impingement of the microparticles on the nail tissue surface;

b) directing the microparticles towards the region of nail tissue surface, thereby causing the microparticles to penetrate the nail tissue surface;

c) scissioning the nail tissue with the impinging microparticles, thereby forming a plurality of free nail microtissue particles, and thereby forming a microconduit through the nail tissue; and

d) thereby releasing the pressure through the microconduit.

26. A mask for defining at least one localized area of a tissue surface region for formation of a microconduit by microparticle impingement, the mask comprising:

a) a membrane that has a thickness in a range of between about one micrometer and about one thousand micrometers;

b) at least one microhole in said membrane, the microhole having a diameter in a range of between about three micrometers and about one thousand micrometers; and
c) means for positioning said membrane on a tissue surface.

27. The mask of claim 26, wherein the membrane is conformable to the tissue surface.